Removable Partial Dentures

LCDR Sean R. Kelly

USN, DC

Comprehensive Dentistry

Purpose

“the preservation of that which remains and not the meticulous replacement of that which has been lost.”

- Muller DeVan (1952)

Goals

- Eliminate disease
- Preserve what remains
- Establish or increase masticatory efficiency
- Develop and restore esthetics
- Maintain or improve phonetics

RPD Terminology

- Stability
- Retention
- Retainer

RPD Terminology

- the quality of a prosthesis to be firm, stable or constant and to resist displacement by functional, horizontal, or rotational stresses

- that quality inherent in the denture that resists the vertical forces of dislodgment

- any type of clasp, attachment, device, etc., used for the fixation, stabilization, or retention of a prosthesis.

Indications

- Great edentulous span
- No posterior abutment
- Excessive ridge resorption
- Age
- Cost

Indications

- Reduced periodontal support of remaining teeth
- Need for cross-arch stabilization
- Patient's desire
- Physically or emotionally handicapped

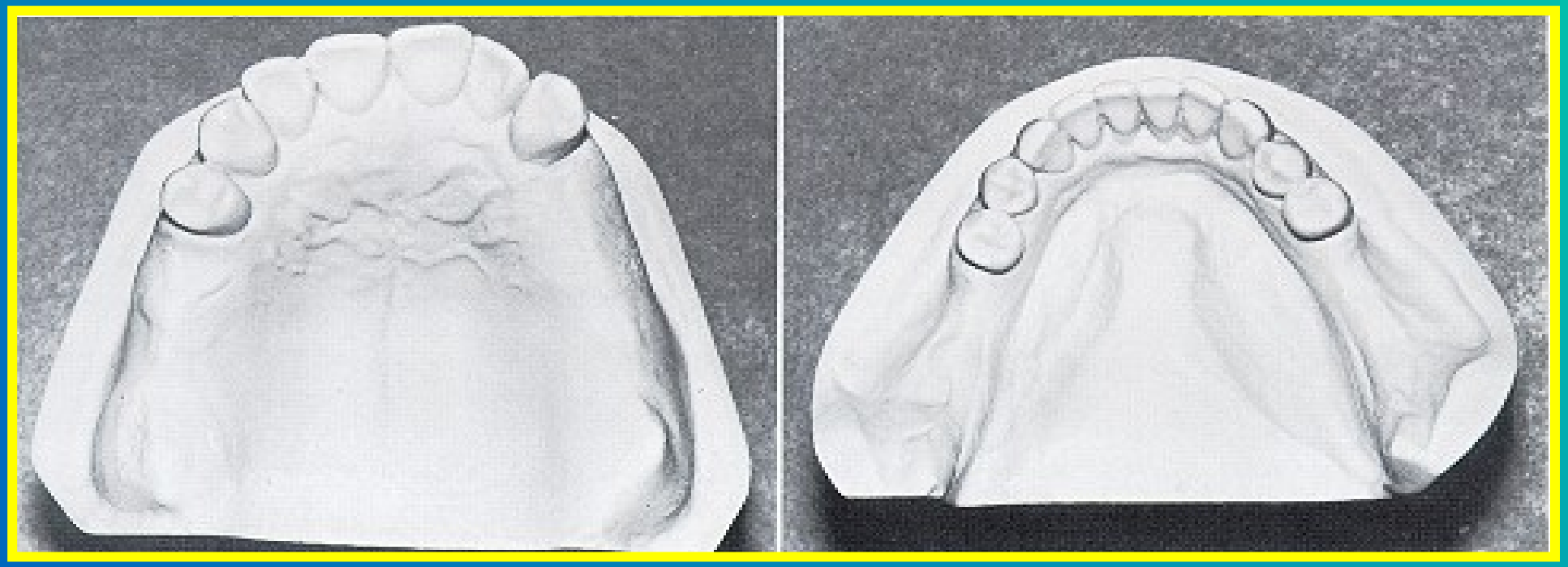
Classification of partially edentulous arches

- **Kennedy Class I**

Bilateral edentulous areas located posterior to the remaining natural teeth.

Classification of partially edentulous arches

- **Kennedy Class I**



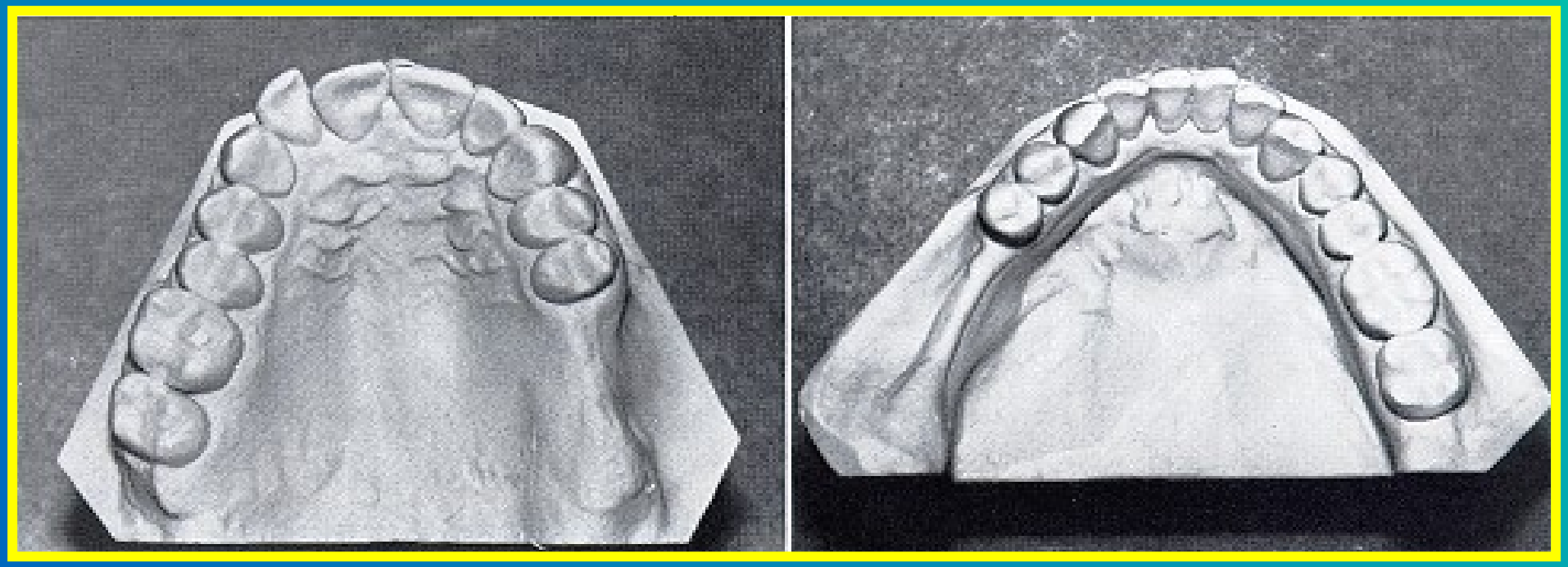
Classification of partially edentulous arches

- **Kennedy Class II**

Unilateral edentulous area located posterior to the remaining natural teeth.

Classification of partially edentulous arches

- **Kennedy Class II**



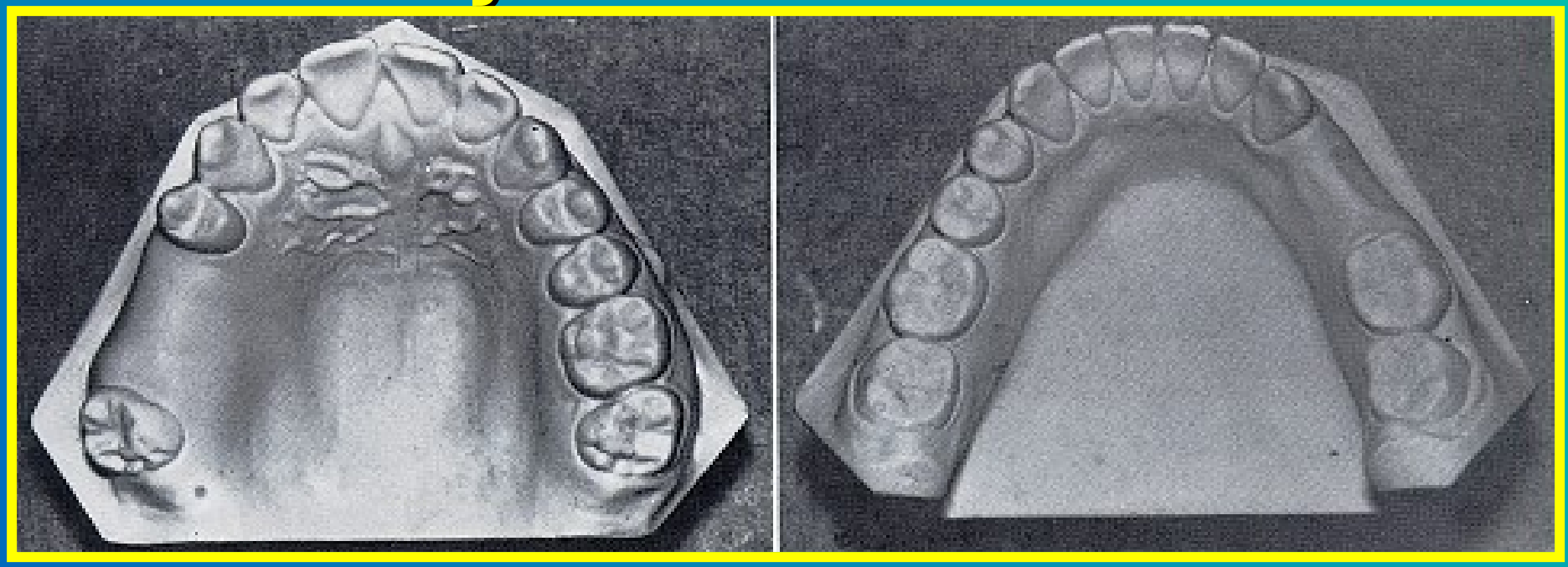
Classification of partially edentulous arches

- **Kennedy Class III**

Unilateral edentulous area with natural teeth both anterior and posterior to it.

Classification of partially edentulous arches

- **Kennedy Class III**



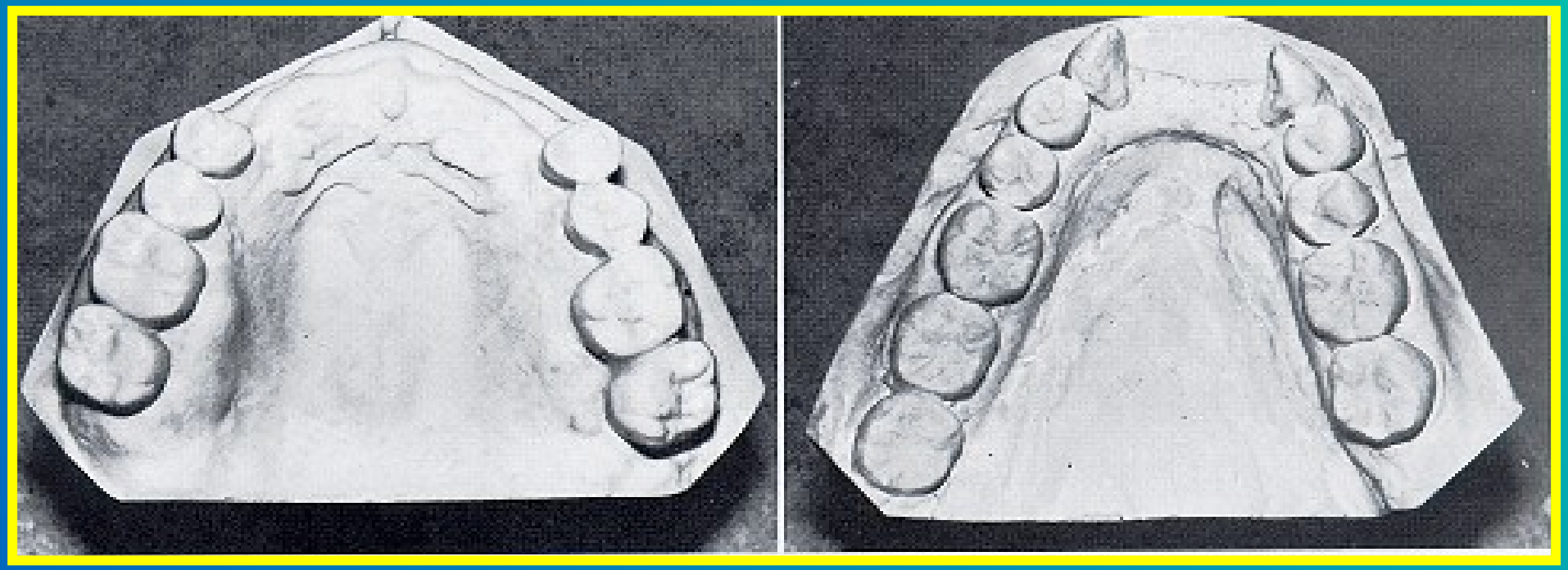
Classification of partially edentulous arches

- **Kennedy Class IV**

Single, bilateral edentulous area located anterior to the remaining natural teeth.

Classification of partially edentulous arches

- **Kennedy Class IV**



Classification of partially edentulous arches

- **Kennedy Class V**

An edentulous area bounded anteriorly and posteriorly by natural teeth but the anterior abutment (lateral incisor) is not suitable for support.

- O.C. Applegate (1960)

Classification of partially edentulous arches

- **Kennedy Class VI**

An edentulous area in which adjacent teeth are capable of support for a FPD, but possible damage to the pulp might occur if crown preparation were attempted.

- O.C. Applegate (1960)

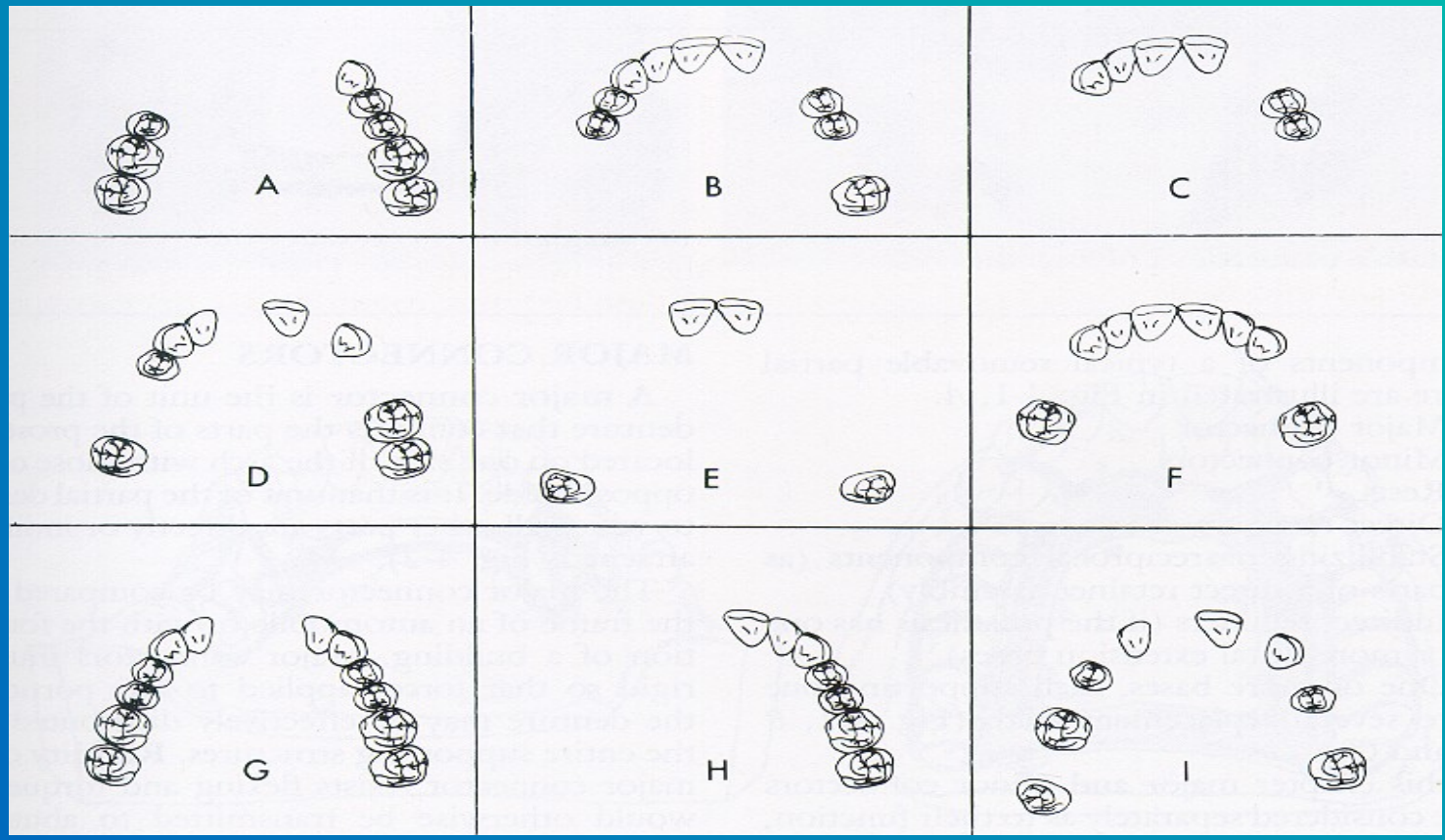
Classification of partially edentulous arches

- **Modifications**

Kennedy referred to each additional edentulous area, not each additional missing tooth, as a modification area and included them in the classification by the number of such areas.

Classification of partially edentulous arches

- **Modifications**



Rules to govern the classification system

- Follows (vs precedes) extractions
- If 3rd's are missing & not to be replaced, then not considered
- A 3rd molar used as an abutment is considered in the classification
- A 2nd molar not to be replaced is not considered in the classification

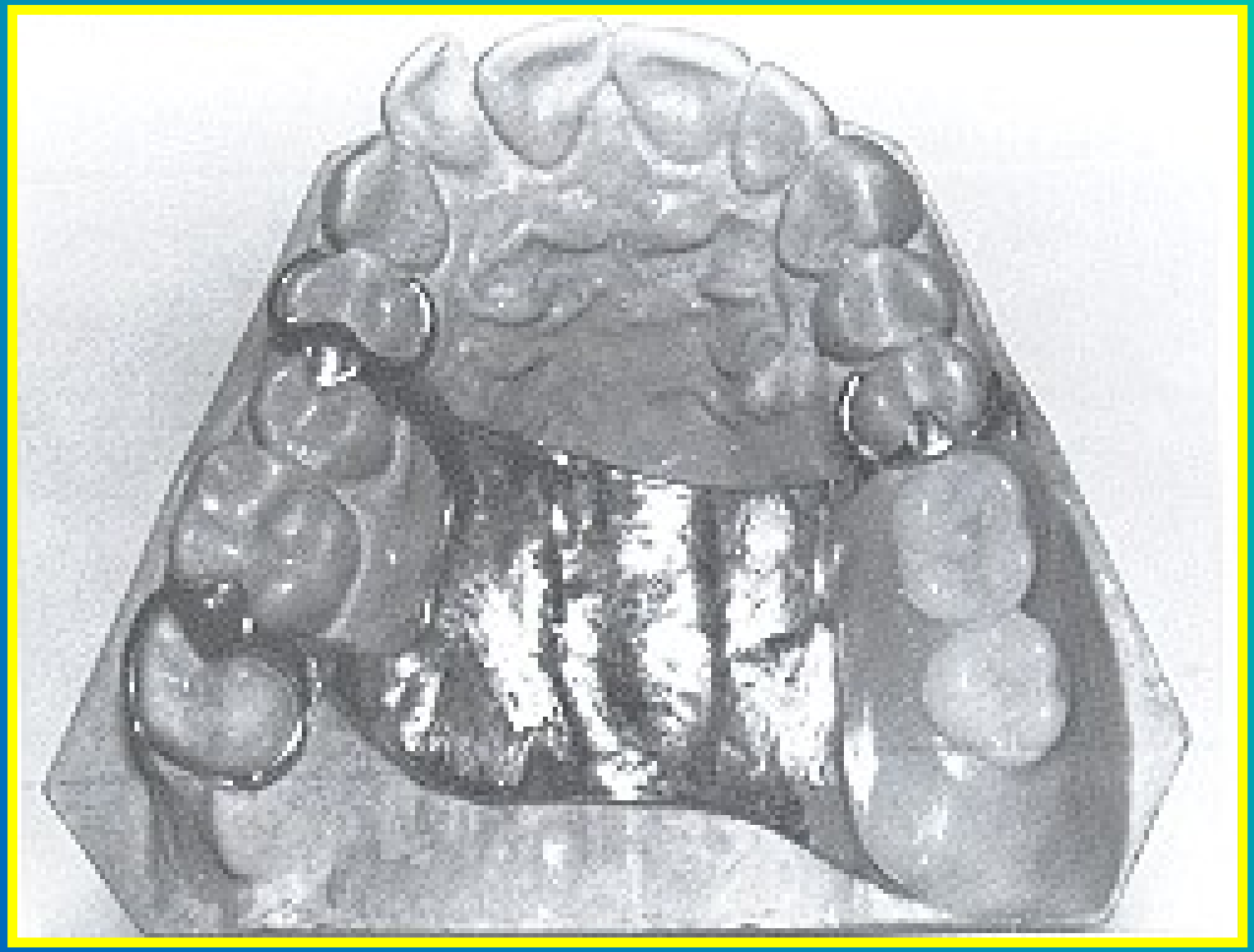
Rules to govern the classification system

- The most posterior edentulous area(s) always determine(s) the class
- Edentulous areas not determining the class are modifications.
- Extent of the modification is not considered, only the number
- No modifications for a class IV

Components of a RPD

- Major connector
- Minor connector(s)
- Indirect retainers
- Rests
- Direct retainers (clasp)
- Denture base
- Teeth

Components of a RPD



Components of a RPD

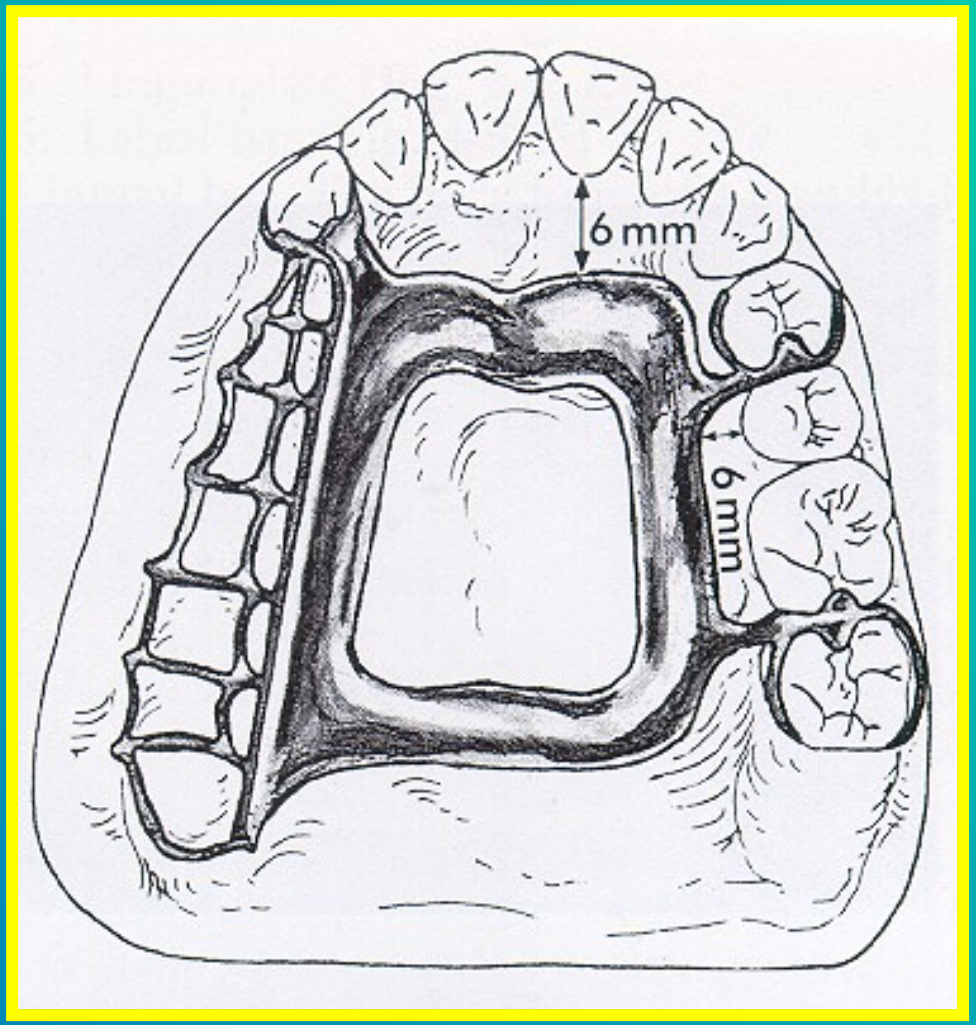
♣ Major connector

Connects the components on one side of the arch to the components on the opposite side of the arch. It must:

- **be rigid**
- **provide vertical support**
- **provide indirect retention**
- **protect soft tissue**
- **provide patient comfort**

Components of a RPD

- Palatal major connector should be located at least 6mm away from gingival margins and parallel to their mean curvature. All adjoining minor connectors should cross gingival tissues abruptly and should join major connectors at nearly a right angle.



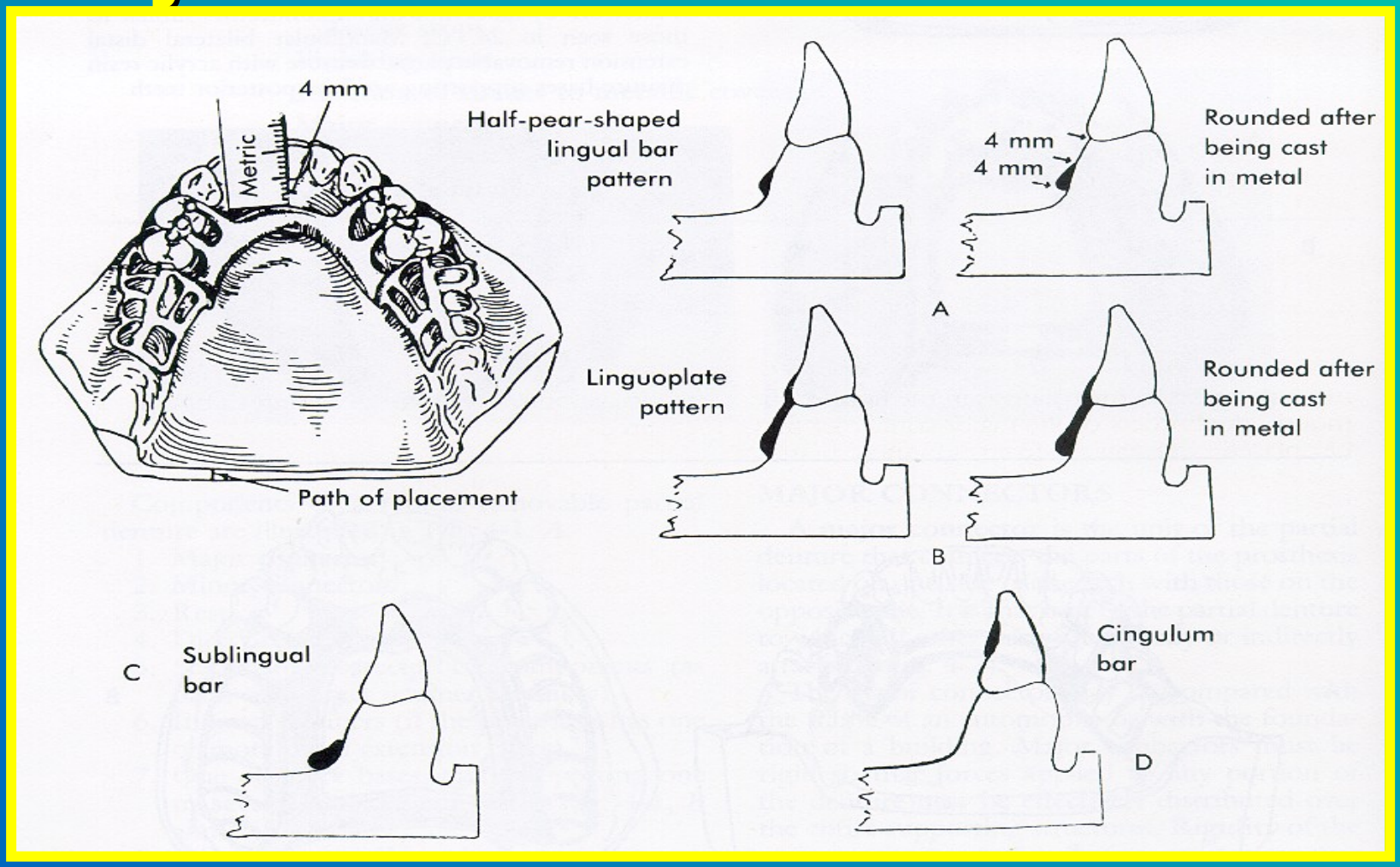
Components of a RPD

- **Major connector - Mandibular**

A lingual bar should be located at least 4 mm inferior to gingival margins, more if possible. The vertical height of a finished lingual bar should be at least 4 mm for strength and rigidity. If less than 8 mm exists between gingival margins and movable floor of mouth, a linguoplate, a sublingual bar or a continuous bar is preferred as a major connector.

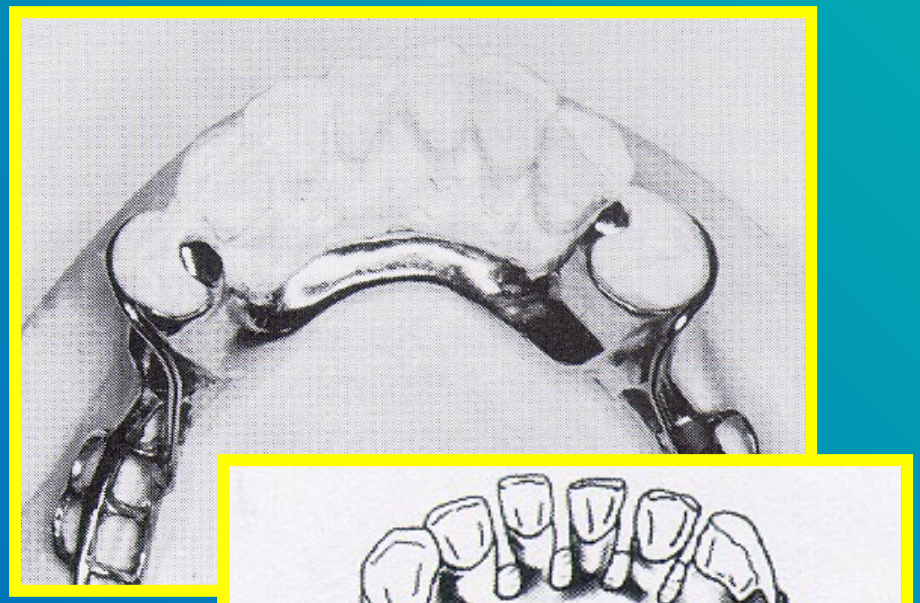
Components of a RPD

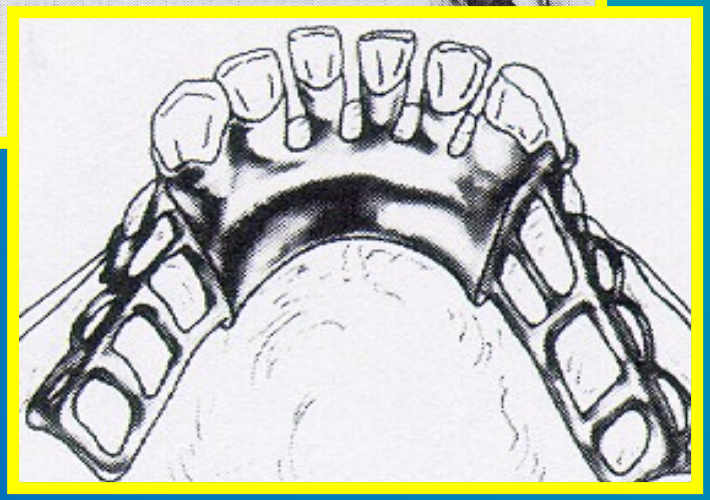
- **Major connector - Mandibular**

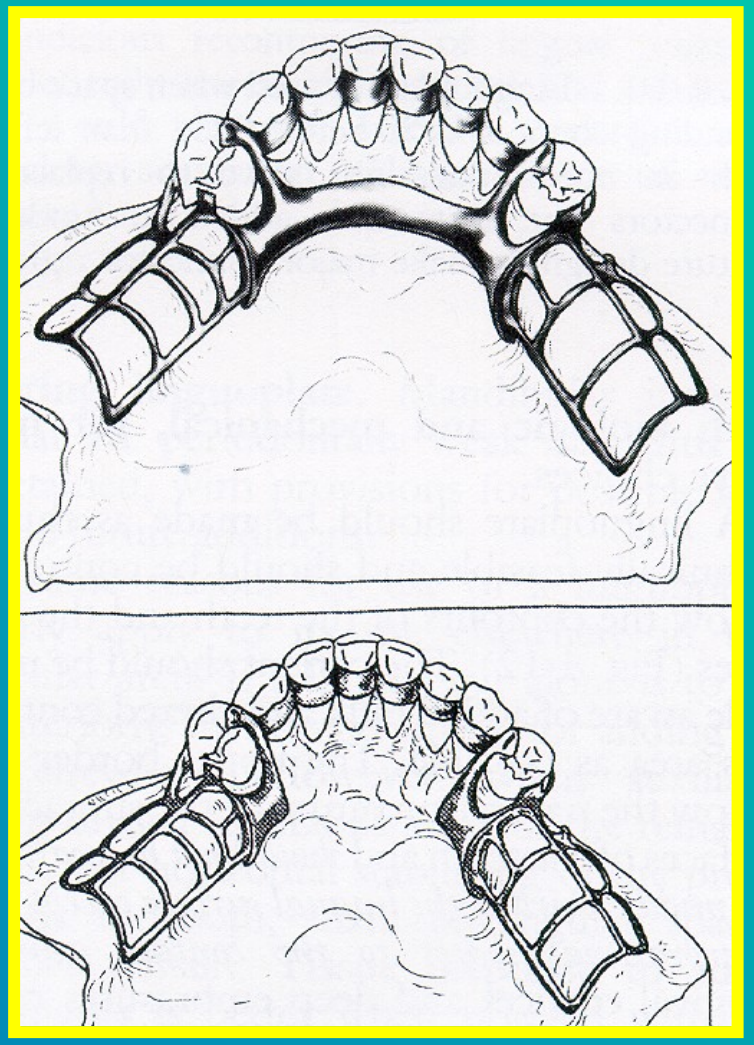


Components of a RPD

- **Major connector**

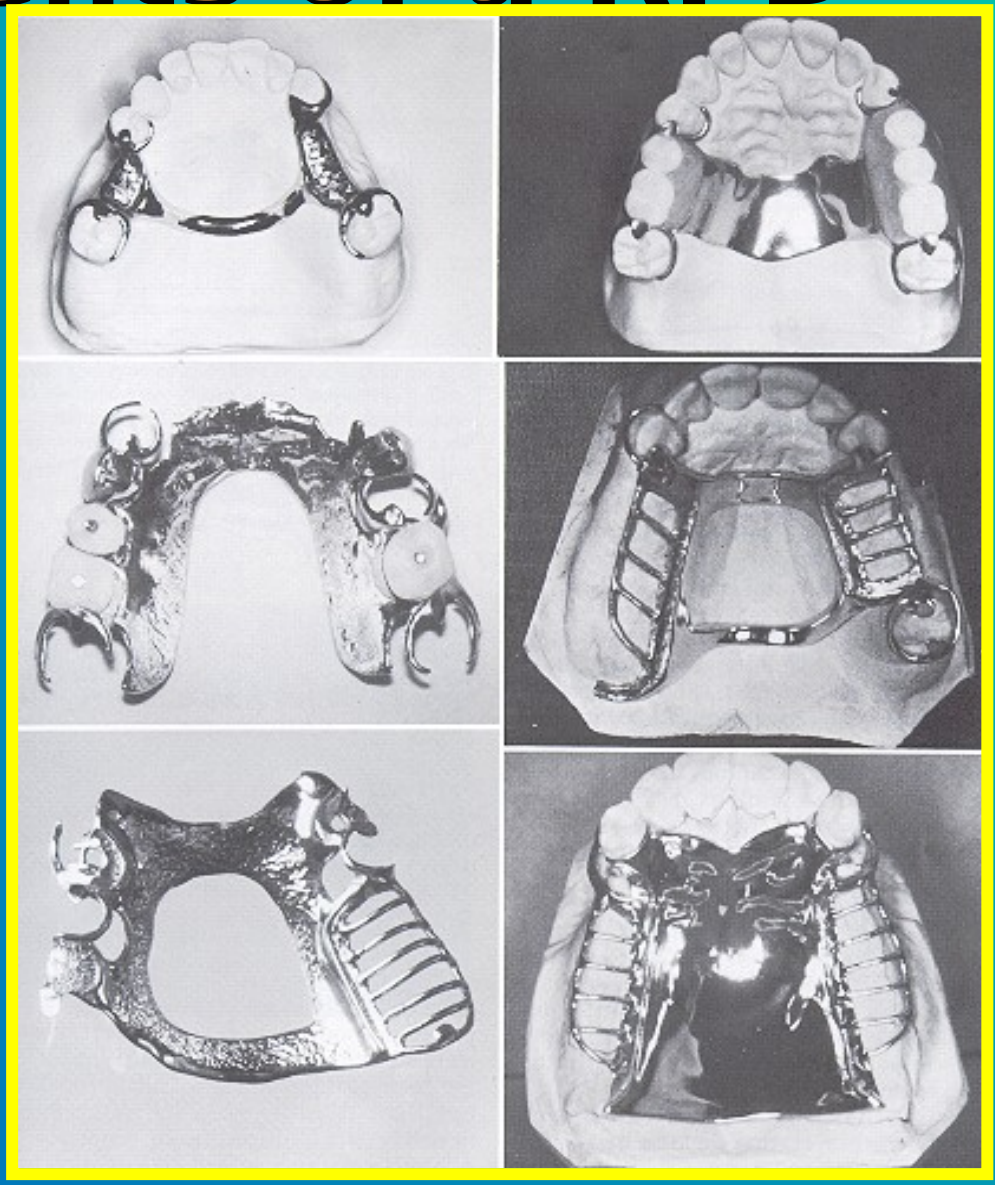






Components of a RPD

- **Major**



Components of a RPD

- **Minor connector**

Connects the the major connector with other components of the denture. It has two functions.

1. Transfers functional stress to the abutment teeth (prosthesis-to-abutment function).

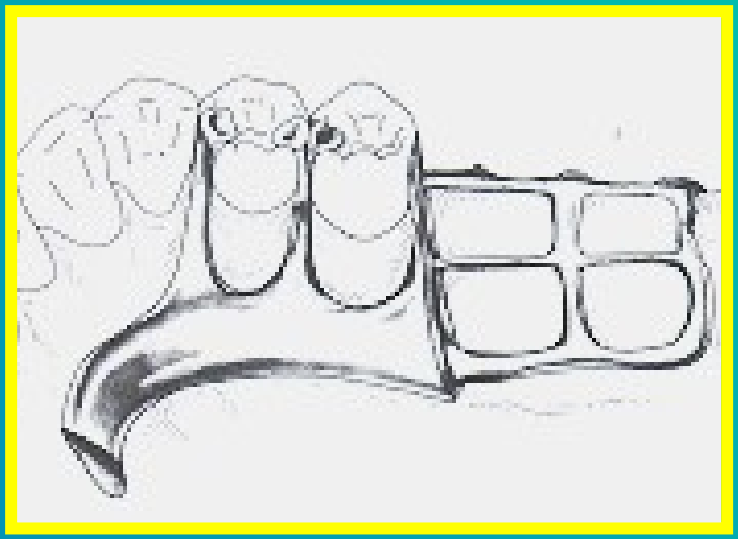
2. Transfers the effect of the retainers, rests, and stabilizing components to the rest of the denture (abutment-to-prosthesis function).

Components of a RPD

- **Minor connector**

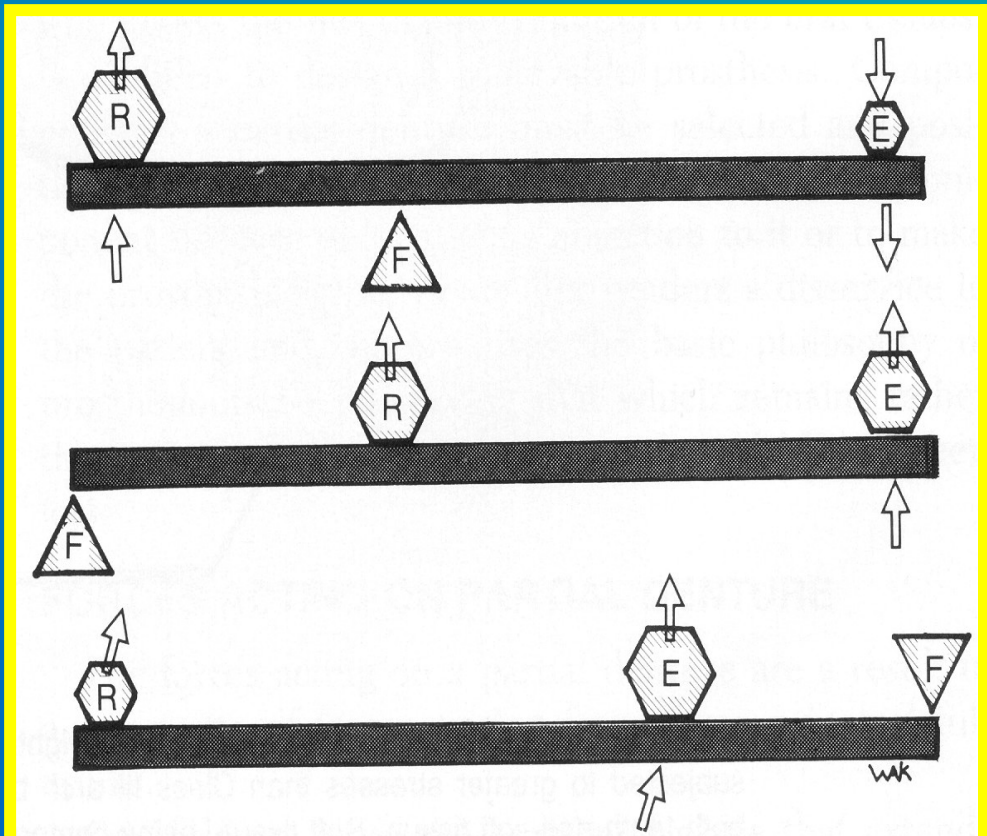
1. Form: Sufficient bulk to be rigid, but not objectionable. Therefore tapered to the teeth to provide smooth transition from tooth to the minor connector.

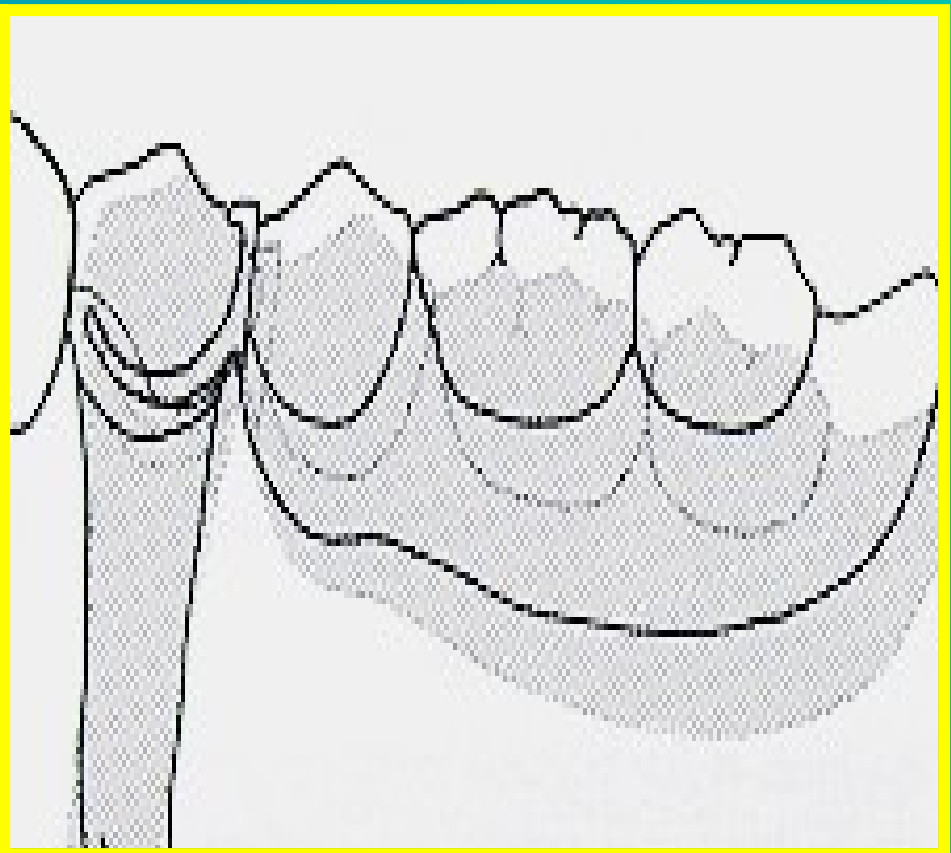
2. Location: When contacting an axial surface of an abutment, is should not be located on a convex surface; instead it should be located in an embrasure in which it will be least



Principles of a RPD

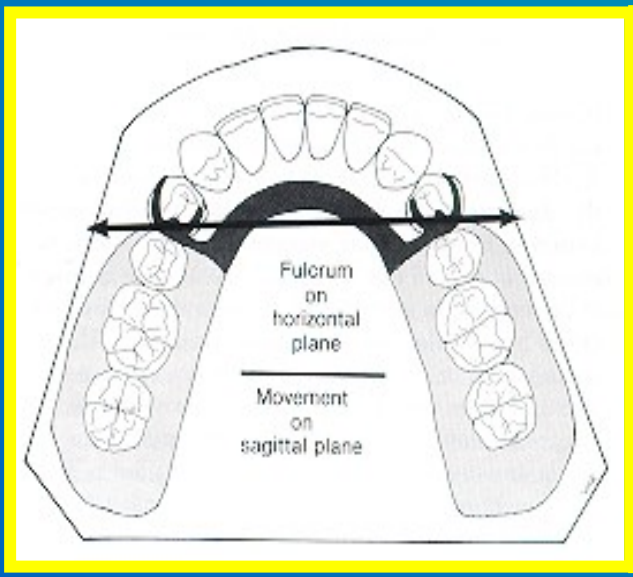
- Levers (Class I, II and III)





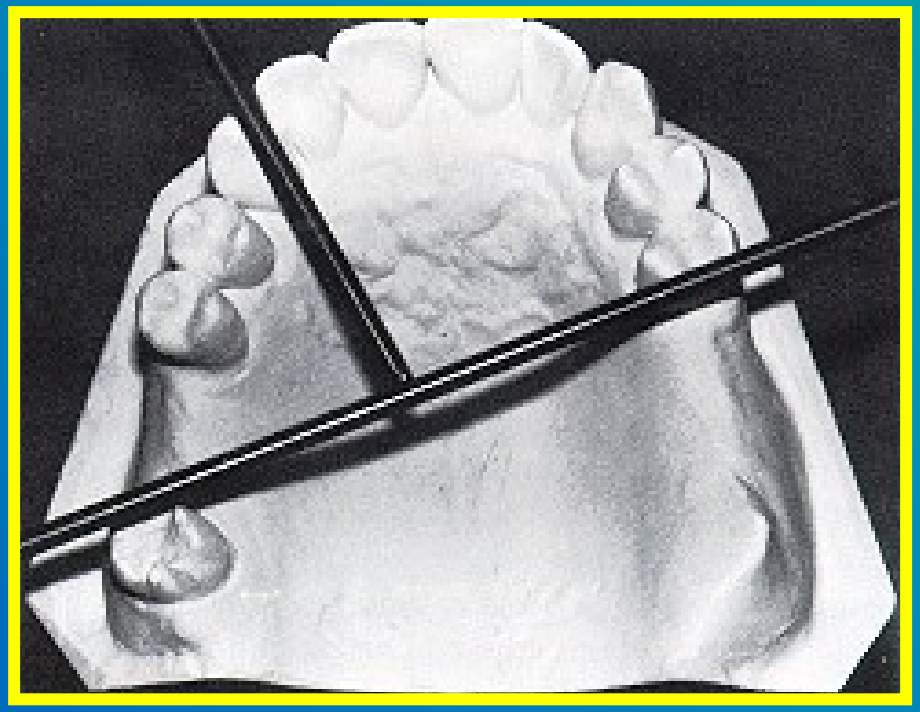
Principles of a RPD

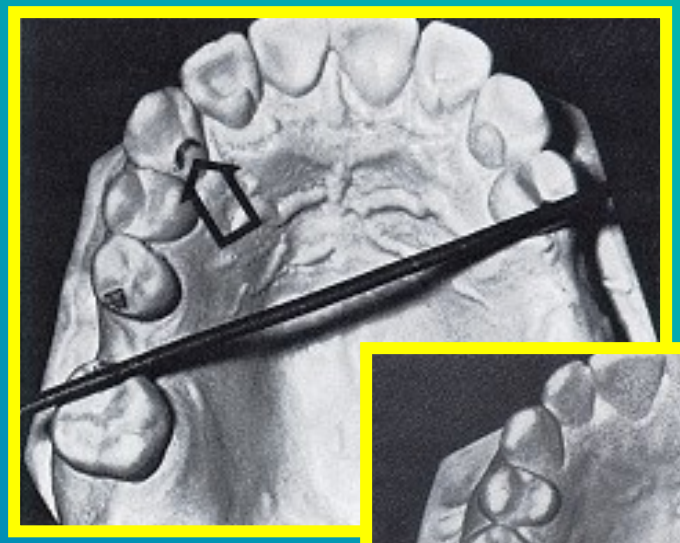
- **Rotation**
  - **Horizontal fulcrum**
  - **Sagittal fulcrum**
  - **Vertical fulcrum**

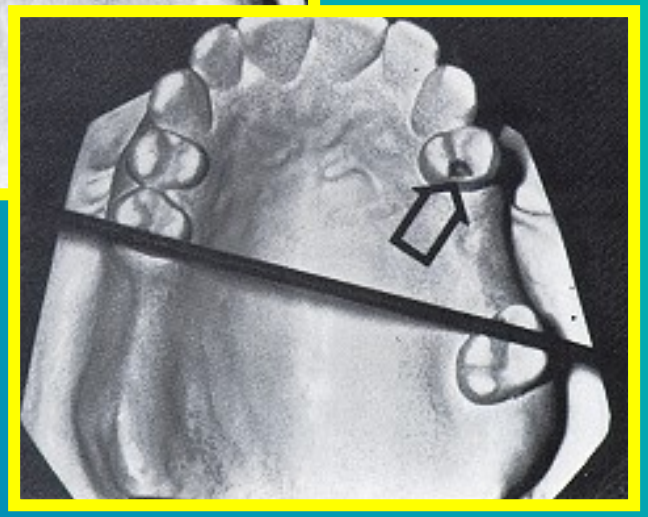


Principles of a RPD

- Indirect retainer (Class II lever)







Components of a RPD

- **Indirect retainers**

- When the denture base is forced to move away from the basal seat, it tends to rotate around one of the fulcrum lines.

- This movement is resisted by rigid units of the partial denture framework (rests) on the opposite side of the fulcrum line from the distal extension base and the activation of the retentive element of the direct retainer (clasp)

- The component should be placed as far as possible from the distal extension base

Components of a RPD

♣ Rests

The primary purpose is to provide vertical support for the partial denture. In doing so it also does the following:

- Maintains components in their planned positions

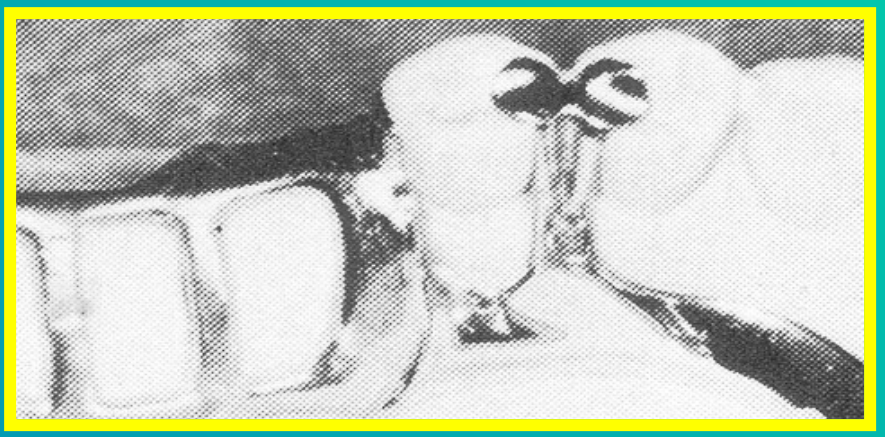
- Maintains established occlusal relationships by preventing settling of the denture

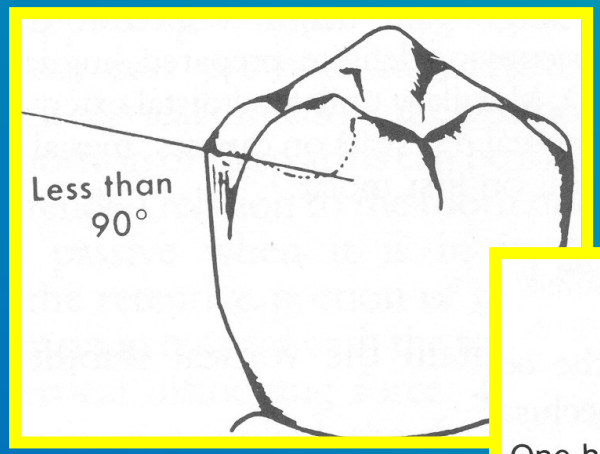
- Prevents impingement of soft tissues

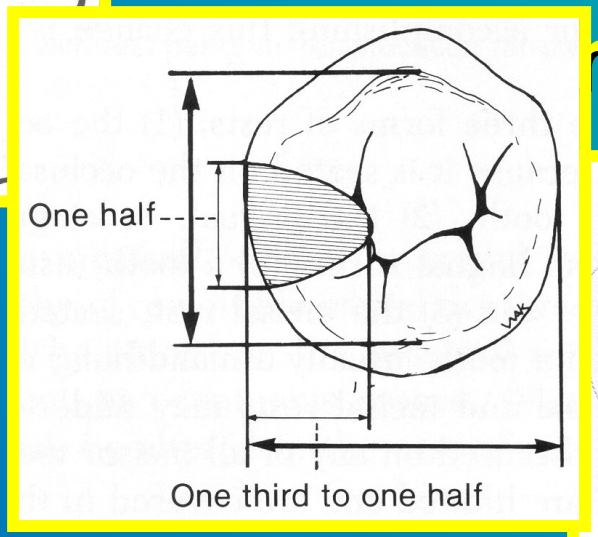
-Directs and distributes occlusal loads to abutment teeth

Components of a RPD

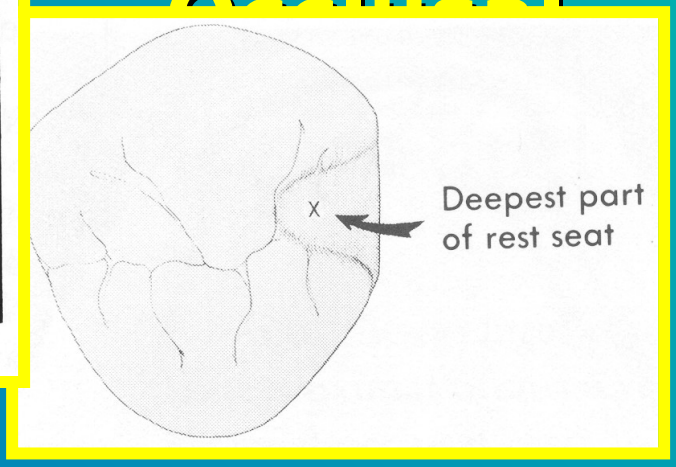
- **Types of Rests**
  - **Occlusal**







- **nterproximal**



Components of a RPD

- **Types of Rests**

  Occlusal

  - Outline is a rounded triangular shape, the apex toward the center of the occlusal surface

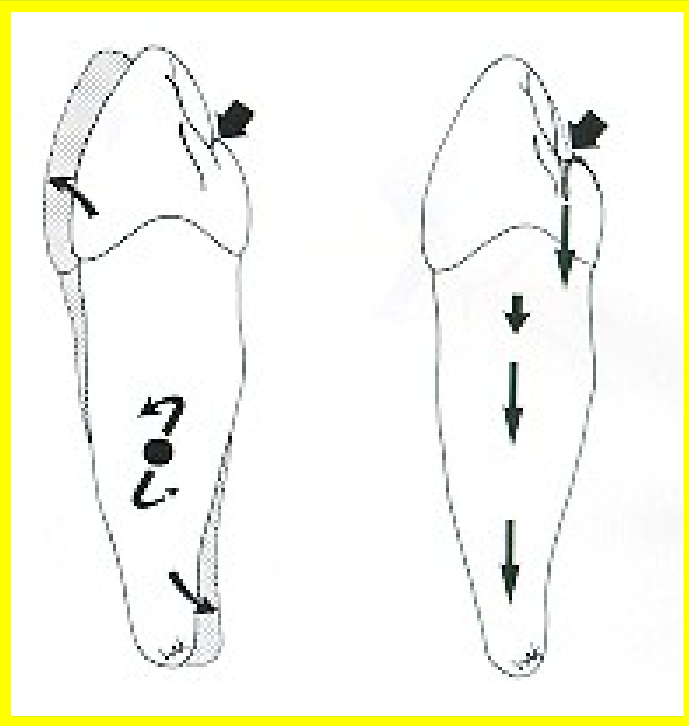
  - It should be as long as it is wide with the base of the triangular shape (at the marginal ridge) at least 2.5 mm

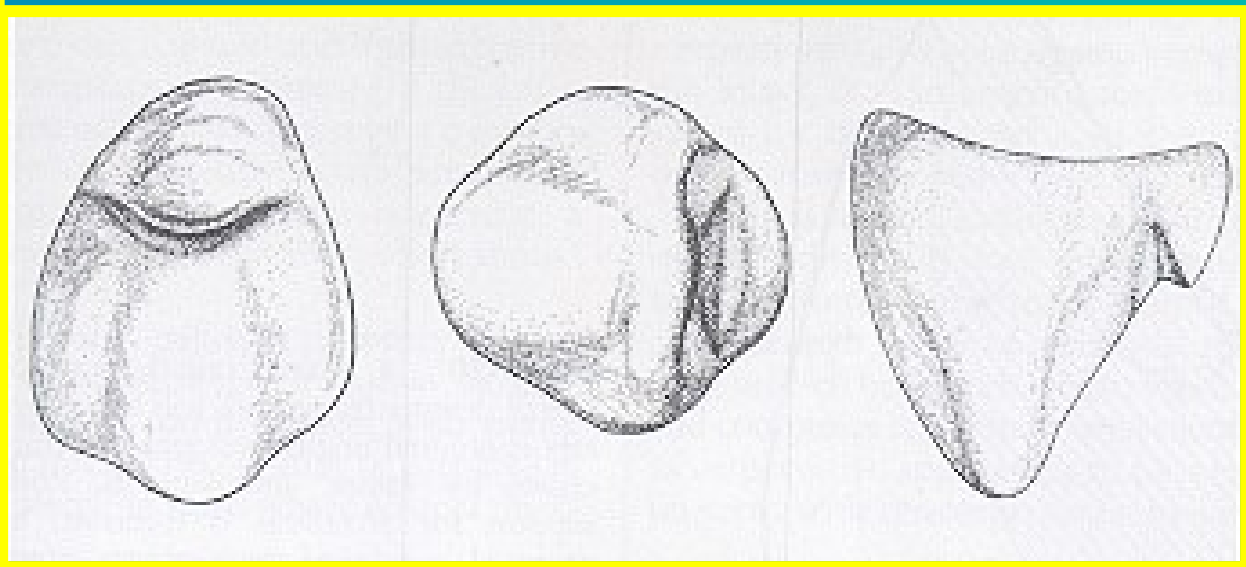
  - Reduction of the marginal ridge = 1.5 mm

  - Floor of the rest seat is apical to the marginal ridge and is spoon shaped (concave)

Components of a RPD

- **Types of Rests**
  - **Cingulum/Lingual**





Components of a RPD

- **Types of Rests**

Cingulum/Lingual

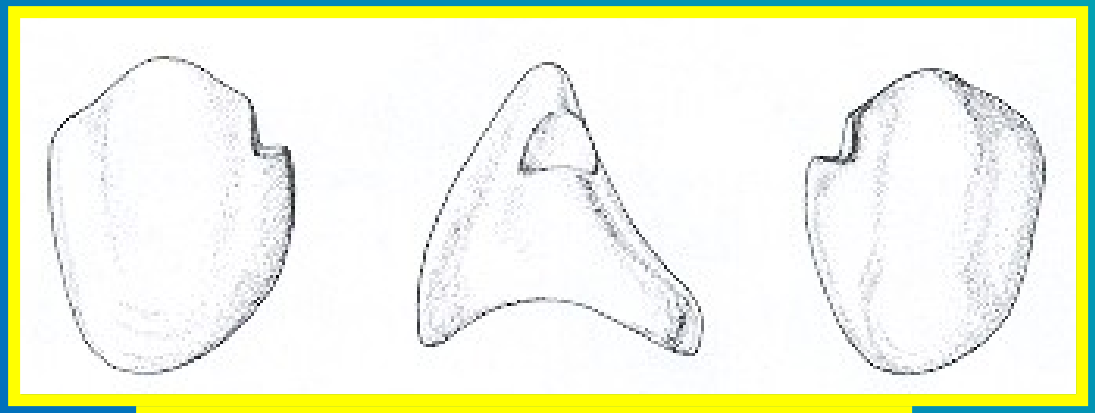
- A slightly rounded V is prepared on the lingual surface at the junction of the gingival and the middle one third of the tooth

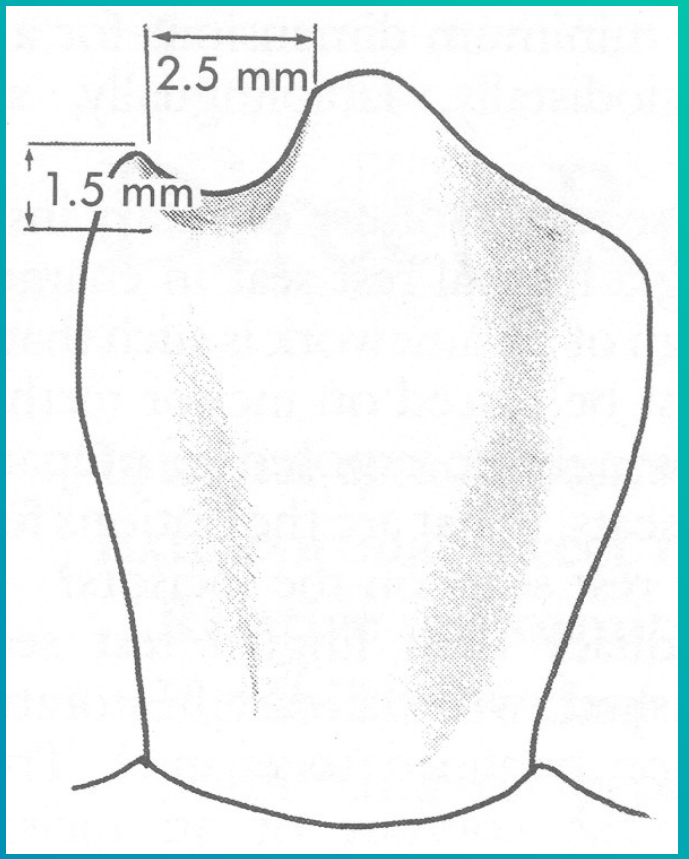
- Mesiodistal length of preparation should be a minimum of 2.5 mm, labiolingual width about 2 mm, and incisal-apical depth a minimum of 1.5 mm

- Should not be done on lower anterior teeth

Components of a RPD

- **Types of Rests**
  - **Incisal**





Components of a RPD

- **Types of Rests**

  Incisal

  - Used predominately as auxiliary rests or as indirect retainers

  - Should be approximately 2.5 mm wide and 1.5 mm deep so that the rest will be strong without having to exceed the natural contour of the incisal edge

Components of a RPD

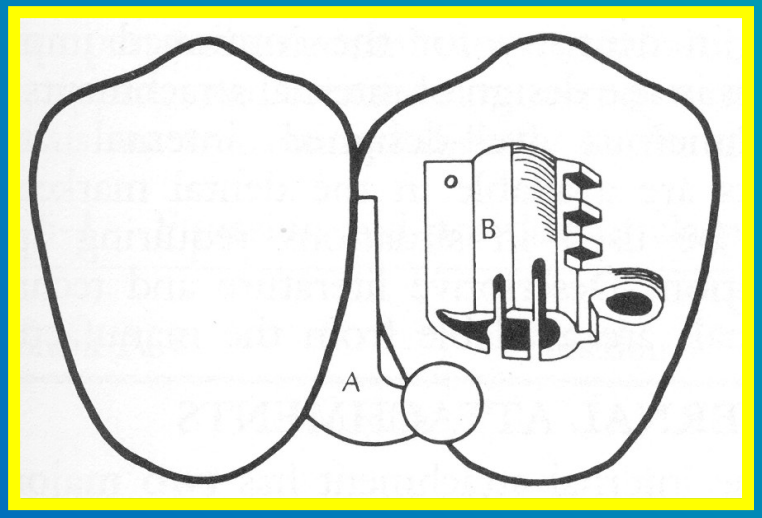
♣ Direct Retainers

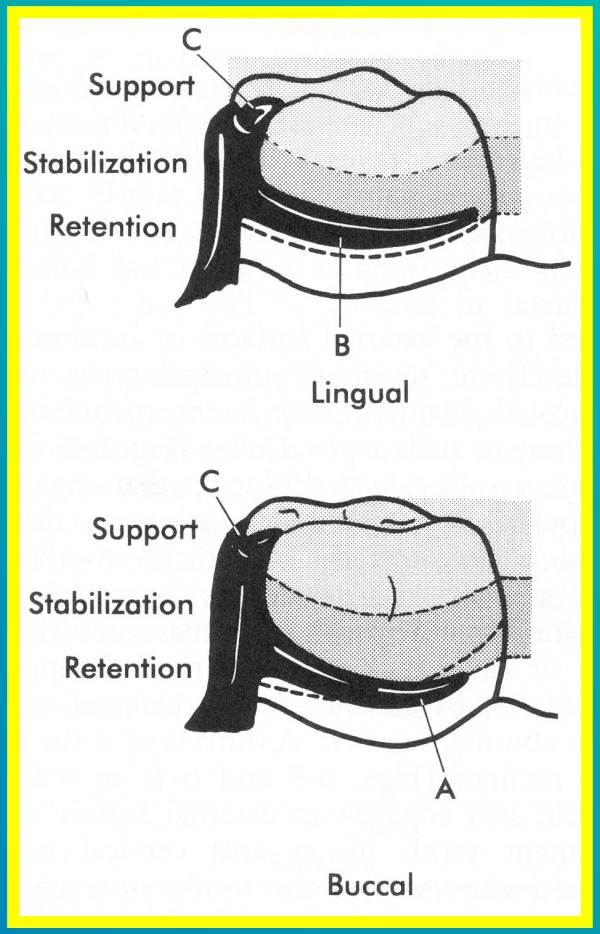
The primary retentive component. Provides mechanical retention by engaging the abutment tooth. Direct retainers may be:

- **intracoronal**
- **extracoronal.**

Components of a RPD

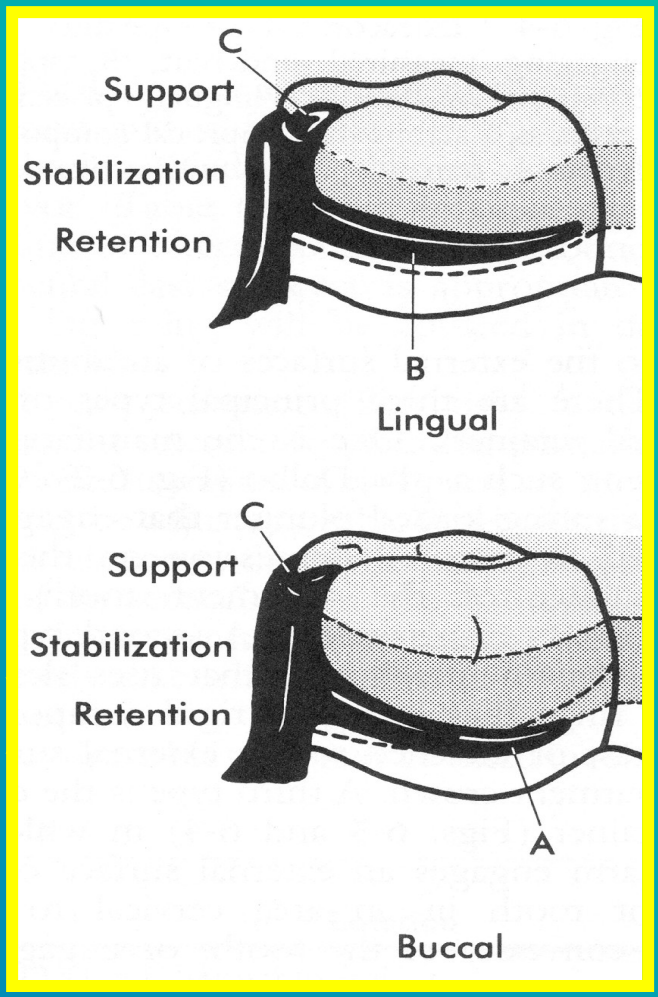
- **Direct Retainers**





Components of a RPD

- **Direct Retainers - extracoronal (clasp assembly)**
  - rest (c)
  - minor connector
  - clasp arm
    - retention (a)
    - stabilization (b

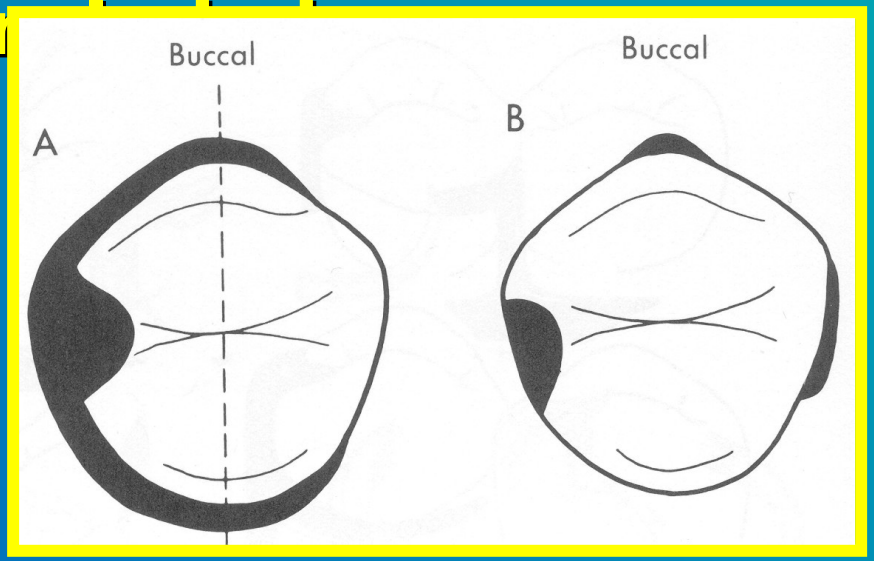


Components of a RPD

- **Direct Retainers**

  - Clasps should be bilaterally opposed

  - Any clasp assembly must satisfy the basic principle of clasp design, which is that more than 180° of the greatest circumference of the crown of the tooth must be in



Components of a RPD

- **Direct Retainers (assembly types)**

- RPI (Rest, Guiding Plate, I Bar, .010”)

- Modified T bar (Rest, GP, 1/2 T bar, .010”)

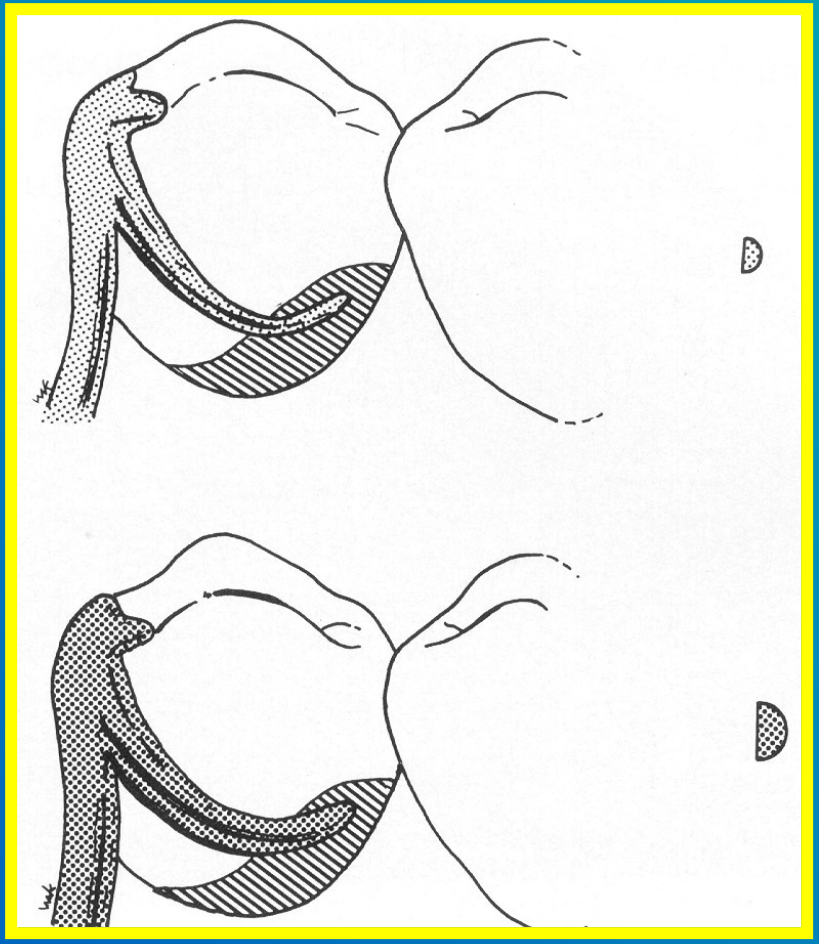
- RPA (Rest, GP, Akers, .010”)

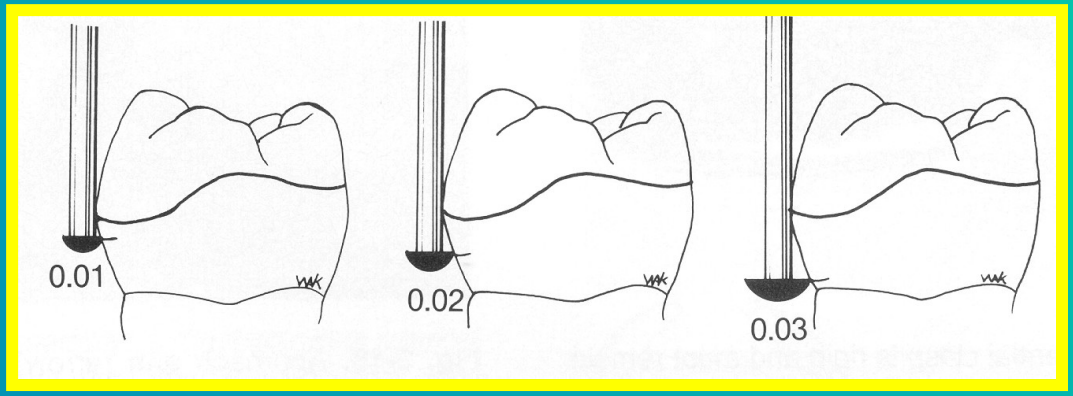
- Combination (Rest, GP, Wrought wire, .015 - .020”)

- Interproximal Cast Circumferential (Rest, GP, Cast Circumferential clasp, .010”)

Components of a RPD

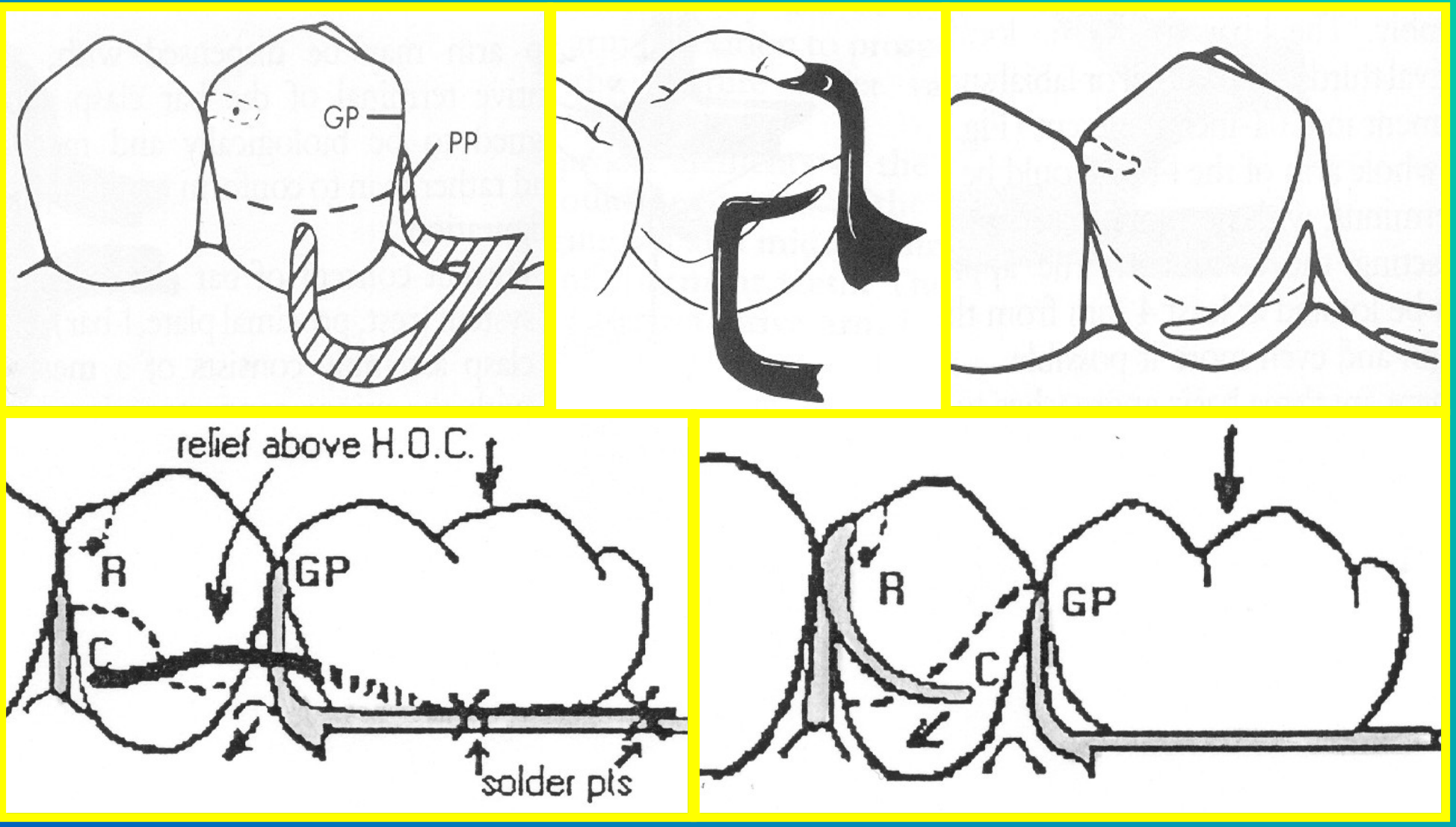
- **Direct Retainers (Retention)**



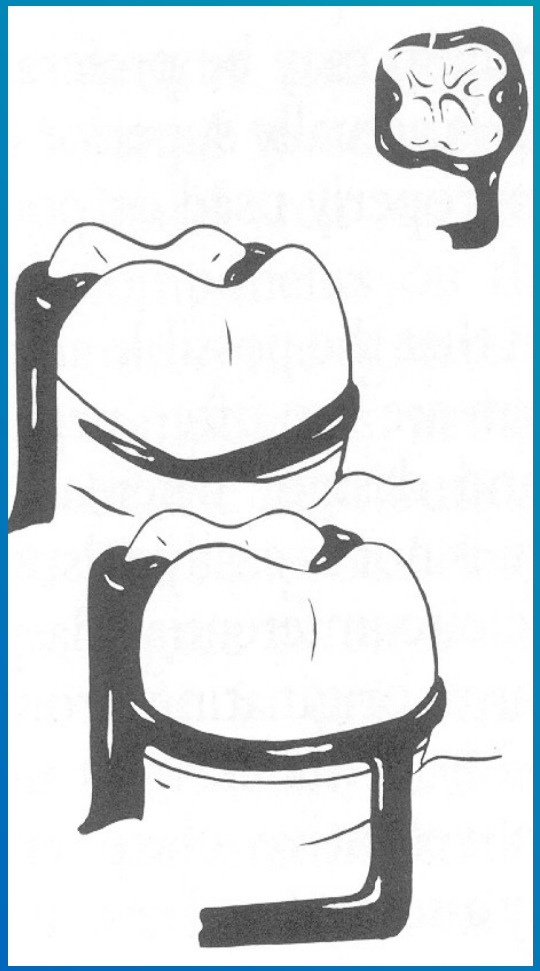


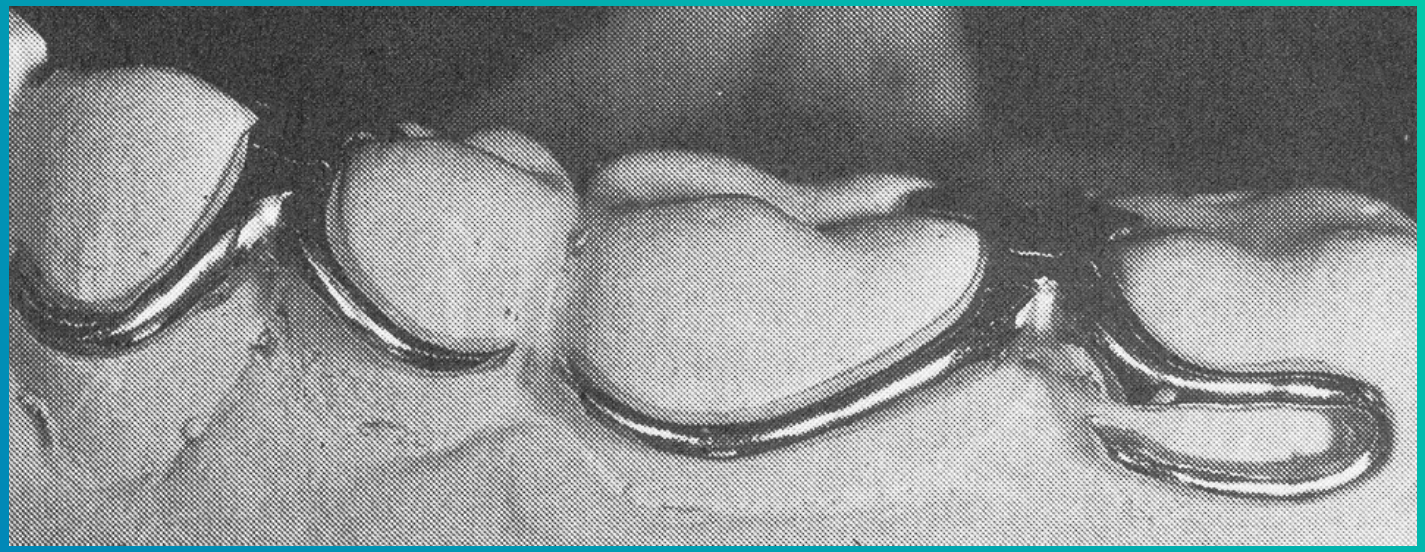
- Rigidity of the material will determine the diameter of the clasp and undercut that is required

Components of a RPD

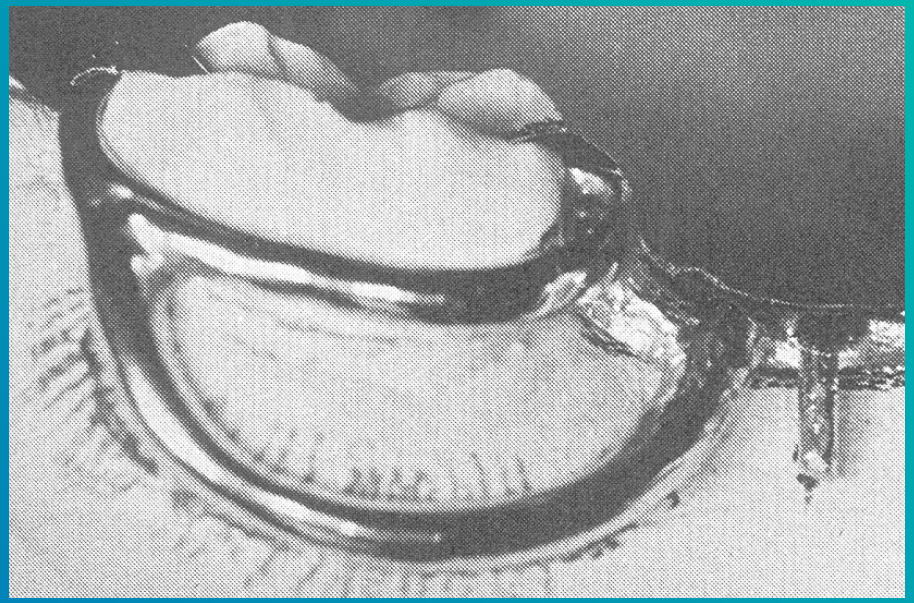


Components of a RPD





Other clasp designs



Components of a RPD

- **Direct Retainers - the reciprocal clasp arm**

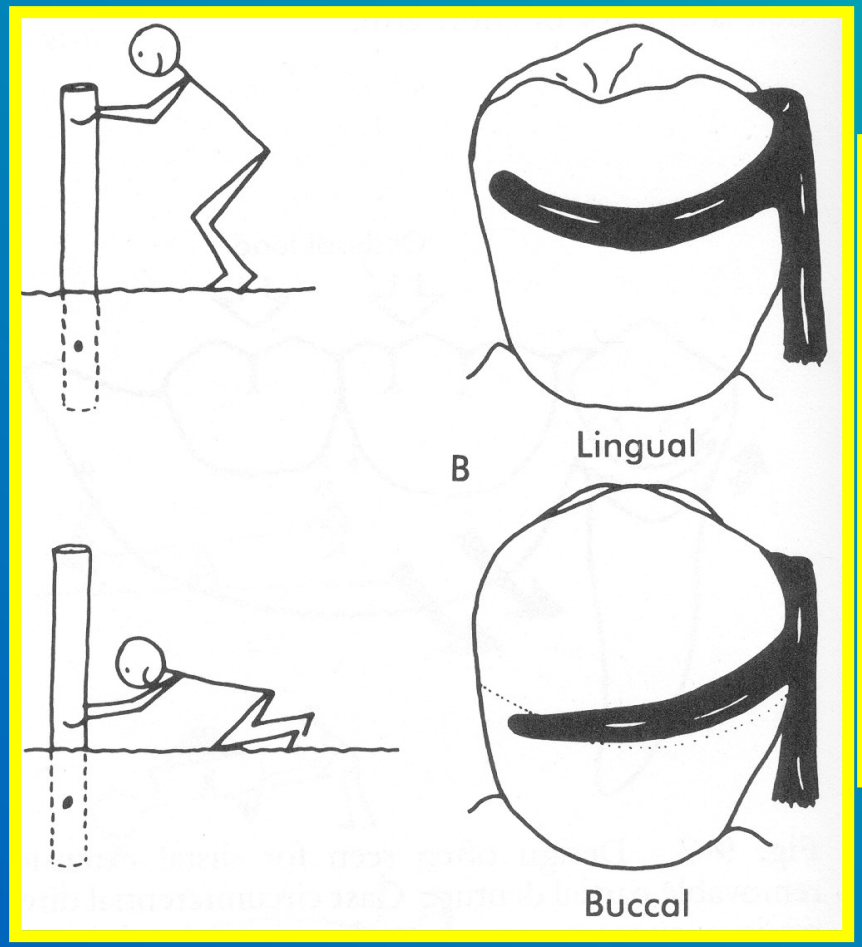
  - Should be located at the junction of the gingival and middle thirds of the abutment

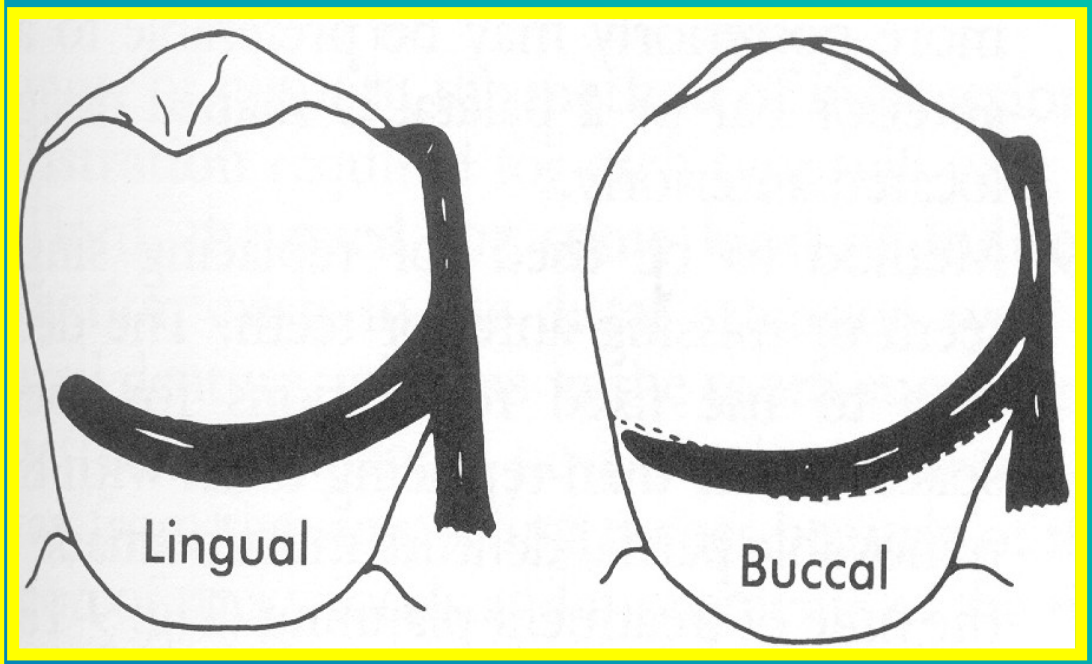
  - Should provide stabilization and reciprocation against the action of the retentive arm which would optimally have its terminal end placed in the gingival third

  - It should be located so that the denture is stabilized against horizontal movement

Components of a RPD

- **Direct Retainers - the clasp**





Components of a RPD

- **Denture base**

  - The part of the denture (metal or resin) that rests on the foundation tissues and to which the teeth are attached

  - Effects the transfer of occlusal forces to supporting oral structures

  - Intimate relationship with underlying tissue provides secondary retention

Components of a RPD

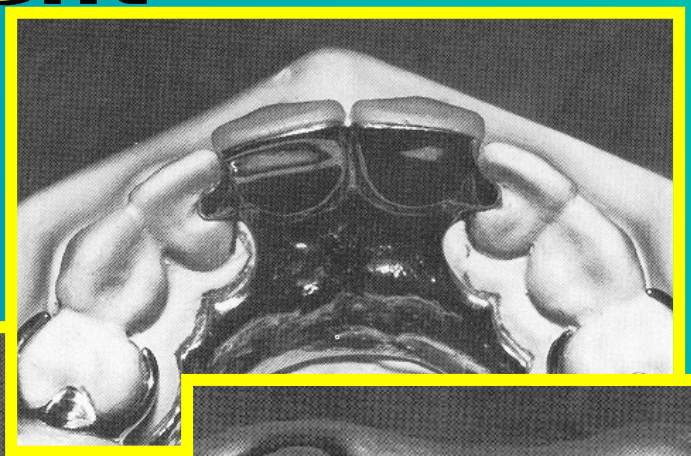
- **Denture base (Ideal material)**
  - Accurately adapts to the tissue
  - Dense, nonirritating surface capable of receiving and maintaining a good finish
  - Thermal conductive
  - Low specific gravity, lightweight
  - Sufficient strength
  - Easily kept clean
  - Esthetic
  - Able to reline
  - Low cost

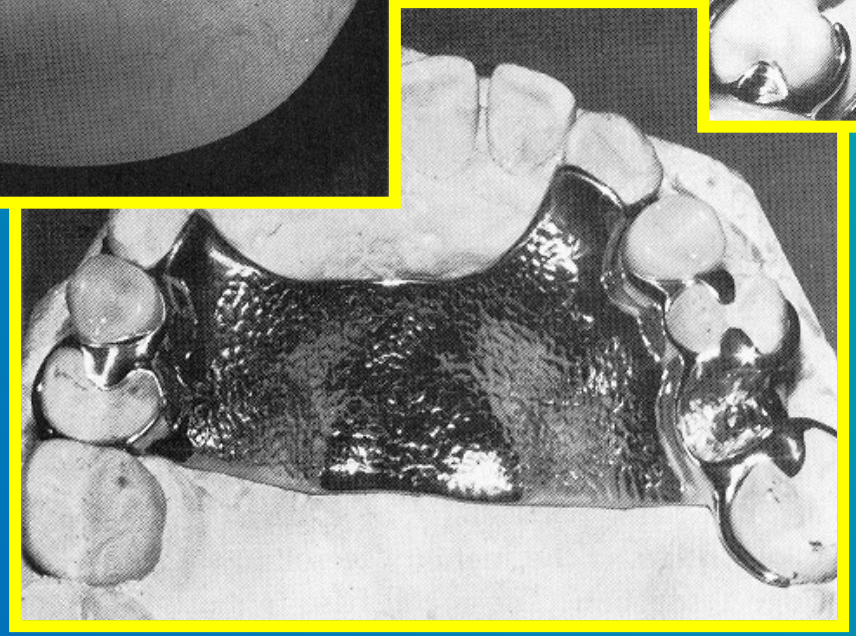
Components of a RPD

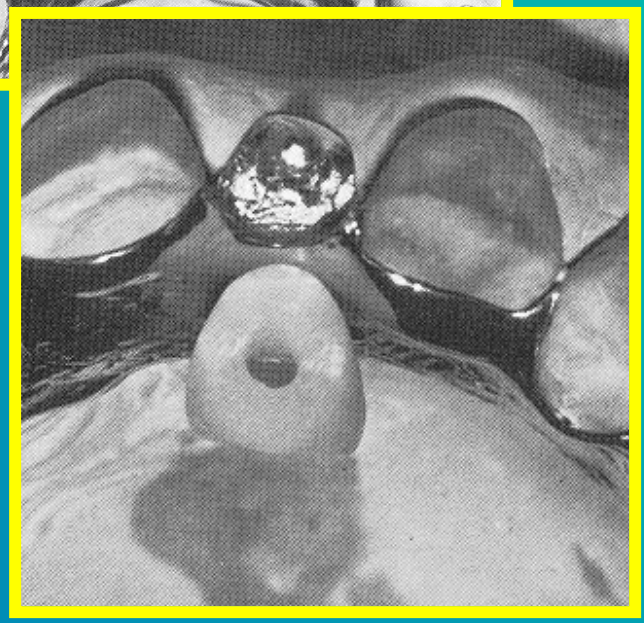
- **Tooth Replacement**
  - Plastic or porcelain teeth processed to the acrylic denture base
  - Plastic or porcelain veneer cemented to a metal backing
  - Tube teeth cemented over a post
  - Reinforced Acrylic Pontic (RAP)
  - Metal pontic
  - Metal pontic with resin facing

Components of a RPD

- Tooth Replacement







Components of a RPD

- Tooth Replacement